

What is claimed is:

1. A method of controlling video signals in a video conference involving a plurality of endpoints,
5 comprising the steps of:

determining, according to a predetermined function, the degree to which a video signal from an endpoint is to be transmitted to endpoints within the conference; and

- 10 dynamically controlling the video output from said endpoint as a result of said determination.

2. A method according to claim 1, wherein the video conference forms part of a multimedia conference, said multimedia conference further including an audio
15 conference between said plurality of endpoints.

3. A method according to claim 2, wherein the determination of the degree to which said video signal is to be transmitted to endpoints within the conference comprises analysing audio signals from the endpoints.

- 20 4. A method according to claim 3, wherein said analysis of audio signals comprises applying an audio mixing algorithm to said audio signals, and using a result of said algorithm to determine the degree to which said video signal is to be transmitted to
25 endpoints within the conference.

5. A method according to claim 4, wherein said audio mixing algorithm results in audio signals from only a subset of said plurality of endpoints being transmitted to the plurality of endpoints.

6. A method according to claim 5, wherein the video signals from only said subset of endpoints are transmitted to said plurality of endpoints.

7. A method according to claim 5, wherein the video signals from said subset of endpoints are transmitted to said plurality of endpoints as higher quality video images than the video signals from the other endpoints outside said subset.

8. A method according to claim 4, wherein the method is applied to more than one endpoint of the plurality of endpoints.

9. A method according to claim 8, wherein the method is applied to all of the endpoints in the conference.

10. A method according to claim 1, wherein the step of controlling the video output from said endpoint comprises terminating the video output from said endpoint during periods when the video signals from said endpoint are not being transmitted to endpoints within the conference.

11. A method according to claim 10, wherein the step of controlling the video output from said endpoint comprises recommencing the video output from said endpoint when it is determined that the video signals from said endpoint are to be transmitted to one or more endpoints within the conference.

12. A method according to claim 10, wherein the method is applied to more than one endpoint of the plurality of endpoints.

13. A method according to claim 10, wherein the
5 method is applied to all of the endpoints in the conference.

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14. A method according to claim 1, wherein the step
of controlling the video output from said endpoint
comprises providing a lower bandwidth video output from
10 said endpoint during periods when the video signals
from said endpoint are being transmitted to other
endpoints with a reduced image quality.

15. A method according to claim 14, wherein said
lower bandwidth video output is provided by reducing
15 the frame rate of the video output.

16. A method according to claim 14, wherein said
conference is carried out on a packet-based data
network and wherein said lower bandwidth video output
is provided by altering the video output to provide a
20 reduced packet size.

17. A method according to claim 14, wherein said
conference is carried out on a packet-based data
network and wherein said lower bandwidth video output
is provided by altering the video output to provide
25 reduced numbers of packets from said endpoint.

18. A method according to claim 14, wherein the method is applied to more than one endpoint of the plurality of endpoints.

5 19. A method according to claim 14, wherein the method is applied to all of the endpoints in the conference.

Sub A1 } 10 ~~20.~~ A method of controlling video signals in a multimedia conference involving a plurality of endpoints communicating with at least audio and video signals over a packet-based data network, comprising the steps of:

15 applying an audio mixing algorithm to said audio signals, and using a result of said algorithm to determine the degree to which the video signals from one or more endpoints are to be transmitted to endpoints within the conference; and

dynamically varying the video output from said one or more endpoints as a result of said determination.

20 21. A method according to claim 20, wherein the step of varying the video output from said one or more endpoints comprises sending a control signal to said one or more endpoints said control signal being selected from a control signal effective to cause the
25 endpoint to cease video output, a control signal effective to cause the endpoint to commence video output, a control signal effective to cause the endpoint to reduce the bandwidth of the video output, and a control signal effective to cause the endpoint to
30 increase the bandwidth of the video output.

22. A method according to claim 20, wherein the variation in video output occurs effectively instantaneously as the result of said algorithm varies over time.

- 5 23. A method according to claim 20, wherein the variation in video output is subject to a hysteresis delay to compensate for short-lived variations in the result of said algorithm over time.

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- 10 24. A method of controlling a multimedia conference involving a plurality of endpoints communicating with at least audio and video signals over a packet-based data network, comprising the steps of:
- 15 selecting the audio signals from a subset of said endpoints and generating therefrom at least one broadcast audio signal for transmission to the plurality of endpoints;
- 20 selecting the video signals from said subset of endpoints and generating therefrom at least one broadcast video signal for transmission to the plurality of endpoints; and
- dynamically controlling the video output from each of the plurality of endpoints in accordance with the characteristics of video signal required from each endpoint to generate the broadcast video signal.

- 25 25. A multimedia conferencing server comprising:
- a plurality of audio and video ports for connecting endpoints to the server via a data network over audio and video channels, respectively;
- 30 a memory unit for associating the audio and video channels from each endpoint;

an audio processing unit for receiving audio signals from said audio ports and generating therefrom broadcast audio signals for transmission to the endpoints via said ports;

5 a video processing unit for receiving video signals from said video ports and generating therefrom broadcast video signals for transmission to the endpoints via said ports; and

Sub A1 10 a control unit for generating control signals to control the video outputs from said endpoints as required to generate said broadcast video signals.

26. A multimedia conferencing server according to claim 25, further comprising a plurality of signalling ports for connecting endpoints to the control unit of
15 the server via said data network over signalling channels, whereby said control signals may be issued directly from the server to the endpoints.

27. A multimedia conferencing server according to claim 25, further comprising one or more control
20 channel ports for connection to a call server, said endpoints being connected to said call server over signalling channels, whereby said control signals may be relayed from the conferencing server to the endpoints via said call server.

25 ~~28.~~ A multimedia conferencing system comprising a conference server and a call server, wherein the conferencing server comprises:

30 a plurality of audio and video ports for connecting endpoints to the conferencing server via a data network over audio and video channels,

respectively;

a memory unit for associating the audio and video channels from each endpoint;

5 an audio processing unit for receiving audio signals from said audio ports and generating therefrom broadcast audio signals in accordance with for transmission to the endpoints via said ports;

Sub AI 10 a video processing unit for receiving video signals from said video ports and generating therefrom broadcast video signals for transmission to the endpoints via said ports;

a control unit for generating control signals to control the video outputs from said endpoints as required to generate said broadcast video signals; and

15 one or more control channel ports for connection to said call server;

and wherein the call server comprises:

20 a plurality of signalling ports for connecting said endpoints to the conferencing server via said data network over a signalling channel;

whereby said control signals may be relayed from the conferencing server to the endpoints via said call server.

25 29. A multimedia conferencing system according to claim 28, further comprising a data network for carrying said audio, video and control signals, and a plurality of endpoints connected to said conference server and call server via the data network.

30 30. A multimedia conferencing system according to claim 29, wherein said data network is a packet-based data network.

31. A multimedia conferencing system according to claim 29, wherein one or more of said plurality of endpoints are logical entities comprising a number of distinct physical devices.

5 32. A computer program product containing instructions in machine readable form which when executed cause a computer associated with a video conference server to:

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10 determine, according to a predetermined function, the degree to which a video signal from an endpoint communicating with the server is to be transmitted to other endpoints communicating with the server; and
issue control signals based on said determination to said endpoint to dynamically control the video
15 output therefrom.

33. A computer program product according to claim 32, wherein said computer determines the degree to which said video signal from said endpoint is to be transmitted by analysing audio signals sent from the
20 endpoints to the server.

34. A computer program product according to claim 33, wherein said analysis of audio signals is carried out by the computer applying an audio mixing algorithm to said audio signals, and using a result of said
25 algorithm to determine the degree to which said video signal is to be transmitted to endpoints within the conference.

35. A computer program product according to claim 32, wherein said control signals are effective to stop or

start transmission of the video output from said endpoint.

36. A computer program product according to claim 32, wherein said control signals are effective to increase
5 or decrease the bandwidth of the video output from said endpoint.

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10 37. A computer program product according to claim 32, wherein said control signals are effective to reduce or increase the frame rate of the video output from said endpoint.

38. A computer program product according to claim 32, wherein said control signals are effective to reduce or increase the image resolution of the video output from said endpoint.

15 39. A computer program product according to claim 32, wherein said control signals are effective to change the video codec of the video output from said endpoint.

20 40. A computer program product according to claim 32, wherein when said computer determines a change in the degree to which said video signal is to be transmitted, said instructions are further effective to cause the computer to observe a hysteresis delay before issuing different control signals to said endpoint.

25 41. A computer program product according to claim 40, wherein when said computer determines, within said hysteresis period, a reversal of said change in the degree to which said video signal is to be transmitted,

said instructions are further effective to prevent the computer from issuing different control signals to said endpoint.

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- 5 42. A computer program product according to claim 32, wherein when said instructions are further effective to cause the computer to maintain a data structure in which the current status of the video output from said endpoint is recorded.

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